power between hoisting, swinging and truck motion with a lever and link to control the speed in the engine. These are placed at a commanding position on the floor of the frame.

The lift is three part, using a 1½ inch chain.

The boiler is vertical, of 75 h. p., carrying 100 lb. steam pressure, placed over the counterweight, which is ballasted with 75 tons of iron. The total weight of each crane is 192 tons.

They were built by Wm. Sellers & Co., Philadelphia.

Improvements in the Manufacture of Dyestuffs.

BLACKISH BLUE AZO DYE.

This new dyestuff is derived from equal molecular proportions of diazotized dianisidin, the sodium salt of mono-sulpho-dioxy-naphthoic acid, and (1·4) alpha-naphthol alphamono-sulphonic acid of Nevile & Winther, and which is a grayish black glittering powder of a metallic luster, easily soluble in water with a blackish blue, in concentrated sulphuric acid with a green-blue coloration; difficultly soluble in alcohol and insoluble in ether and benzine.

IMPROVED DYE FROM ALPHA OXYUVITIC ACID.

The improvement consists in the new process of manufacturing of meta-azo compounds serving as coloring matters, said process consisting in combining alpha oxyuvitic acid with diazo compounds.

GRAY BLACK TETRAZO DYE.

This dyestuff is produced in combining one molecular proportion of tetrazo-diphenyl or ditolyl with two molecular proportions of the sodium salt of monosulpho-dioxy-naphthoic acid, and which is a dark glittering crystalline powder of metallic luster, which dissolves easily in water with a red-violet, in concentrated sulphuric acid with a pure blue coloration, and is insoluble in alcohol, ether, and benzine.

NEW PINK DYE.

This is a new article of coloring matter, manufactured from the alkali salt of a sulphonic acid derived from fluorescein chloride and mesidine, and having the formula $C_{27}H_{23}O_7N_2SO_6$ alk.; a light red powder easily soluble in hot and cold water, difficultly soluble in alcohol, giving vivid red color, mineral acids precipitating from its aqueous solution, the sulphonic acid in the form of red flakes.

A NEW RED DYESTUFF.

This new red azo dye coloring matter is derived from diazotized mono-nitro-benzidine, salicylic, and alpha-naphthol-alpha-mono-sulpho-acid (Nevile & Winther), and which is a red brown powder difficultly soluble in cold water and alcohol, insoluble in benzine, but readily soluble in warm water, with a yellow-red color.—*Textile Record.*

Silver Mining.

The president of the Huanchaca Mining Company, of Bolivia, was recently reported as saying that he expected that silver would still further decrease in value, but that such decrease would have no effect on the Huanchaca Company, because it could produce silver at a profit even if the price dropped to 270 francs per kilo, or say 42 cents per ounce. This is by no means an idle boast. During 1891, this company mined 5,497,963 ounces of silver at a total cost of $2,414,360, or 44 cents per ounce. This cost in detail as follows: Mining, 16 cents; new works, 6 cents; reduction and smelting, 9 cents; taxes and export dues, 5 cents; general expenses, 8 cents. Notwithstanding the low price of silver during the past year, the output of this mine increased nearly 15 per cent, amounting to 6,667,703 ounces, and the ore reserves are larger than before. For the 15 years ending with 1891, this company produced bullion valued at $43,033,899, paid $14,168,038 in dividends, and has set aside a reserve fund of $1,776,765.

This mine by no means stands alone as regards cheapness of working, although it stands second among the silver mines of the world in point of output. Thus the Broken Hill Proprietary Company, of Australia, the greatest silver mine in the world, produced in six years and a half ending May 30, 1892, a total of 36,512,445 ounces of silver and 152,000 tons of lead, at a total cost of $21,356,235. The cost per ounce of silver varied from 66 cents in 1887 to 41 cents in 1890, the average being 47 cents; the cost per pound of lead varied from 2·3 cents in 1887 to 1·4 in 1892, the average being 1·65 cents. This company has paid dividends amounting to $19,480,000.

In the United States the Ontario Mining Company has, since 1880, produced 26,261,076 ounces of silver at a total cost of $14,771,862, an average of 55 cents per ounce. The Granite Mountain Mining Company has, since 1883, produced 21,430,000 ounces, at a total cost of $8,376,620, an average of 39 cents per ounce. Some of these mines are becoming exhausted, notably the Granite Mountain, but new ones are constantly being discovered, and in all probability will continue to be discovered for many years to come. Thus the recently discovered Creede district produced 5,000,000 ounces in 1892, of which it is said that the greater part was produced at an average cost of less than 40 cents per ounce.—*Eng. and Min. Jour.*

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THE COMMERCIAL NATIONAL BANK OF CHICAGO.

In our issue of May 27, 1893, alluding to the reported failure of the bank established in the Administration building, our correspondent in Chicago inadvertently gave the name as the Commercial National Bank of Chicago, whereas the real delinquent was the Chemical National Bank of that city. Those who are at all acquainted with the monetary affairs of Chicago must have observed the error at once. The Commercial National Bank is well known as one of the safest and most reliable banking institutions in the country, while its officers and directors are distinguished for their sterling integrity and business ability. Such a calamity as the failure of the institution, at the present time, in the height of its prosperity, is out of the question. We greatly regret that the error should have crept into our columns.

PHOTOGRAPHY AT THE WORLD'S COLUMBIAN EXPOSITION.

It is an easy matter for people inclined in this direction to find fault, and in such an enormous under taking as the World's Columbian Exposition there are naturally many things to which exceptions can be taken. But the Exposition is such a grand success, as a whole, and it has been carried out on such a broad plan that fault finding in most instances can only be of a dyspeptic sort. There is one matter, however, that has been allowed to drag which should have been taken up long ago, and which should, even now at this late day, be discussed in such a manner as to bring the attention of the Exposition management to it and lead to reform. We refer to photography in connection with the Exposition.

At the time of the Centennial Exposition dry plates were just coming into use and amateur photography was beginning to be popular. During these intervening years there have been no startling or radical changes in photography, but amateurs have become so skilled, and in many instances have produced such perfect specimens of work, that public taste has been educated up to a point where it accepts only good photographs—pictures in which the subject is well chosen and which also are well developed and printed with care and judgment. So much progress has been made in this direction since the Centennial that people naturally expect to find on sale at the Columbian Exposition photographs that the photographic fraternities would feel proud of. There never has been opportunity for such a harvest of fine pictures as this exposition affords. It has a large amount of ornamental statuary that is acknowledged to be thoroughly artistic and beautiful. Its buildings are infinitely finer in design than anything ever seen in the new world. The grounds in which the Exposition is located are a masterpiece in landscape gardening. Many people of this country as well as many Europeans who have traveled extensively are astonished at the conception of the Exposition and at the beauty to be found in Jackson Park.

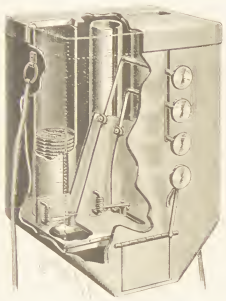
Yet, in spite of all these things, it is not possible to procure thoroughly good official photographs at the World's Columbian Exposition. The workmanship is in no respect better than was to be found at the Centennial. In fact, it is not as good, considering the fact that so many years have intervened and that so many improved processes have since been introduced. The subjects are selected with a lack of judgment and taste, and the developing is of ordinary quality. An exhibition by amateur photographers in any part of the country, judging by the samples that have been seen by members of photographic societies, could show specimens of work superior to the pictures offered for sale at the World's Columbian Exposition. The photographic department is such an appalling failure from the standpoint of the photographer, whether he be amateur or professional, that some public protest should be made against this condition of things before it is too late to have the necessary photographs taken to preserve some of the beauties of the Exposition.

Brass Coloring.

A fine black color, which can be varied to a light brown, can be produced on brass by treatment with an ammoniacal copper solution made by dissolving one part of copper nitrate in two parts of ammonia of specific gravity 0·96 while keeping the solution cool. The brass articles, which must be carefully cleaned, acquire a light tone on first being immersed, but on exposure for some hours become deep black. The treatment can be interrupted when the desired tint is reached. A luster can be put on the articles by rubbing with a little wax or vaseline. The process can be varied and other color effects obtained by treatment of the article after the development of the black color with very dilute hydrochloric acid, which dissolves the coating gradually and thus modifies the tint. The composition of the brass also has an influence on the result, and the coloring produced recalls that seen on Japanese bronze, which has possibly been obtained by a similar method.

A COIN HOLDING AND DELIVERING DEVICE.

A convenient means for carrying assorted pieces of money, and delivering the coins one by one as required, is shown in the picture, the device being adapted for suspension upon the person by means of a strap, or to be fixed in position for store use. The improvement has been patented by Mr. Ernest Berrini, of Seattle, Wash. The case has a forwardly inclined, hopper-like bottom, with an outwardly swinging door, an upwardly extending key or lever, by which the



BERRINI'S COIN HOLDER AND CHANGE MAKER.

door may be opened, terminating in a finger piece, the key being normally pressed outward by a spring, which also holds the door closed. In the removable cover of the case are slots, through which coins may be passed to the coin tubes, which are removable, and any desired number of tubes may be used. Each tube has a vertical slot on one side, through which the coin may be seen when the tube is removed, and at the side of the slot is a graduated scale, by means of which the amount of money in the tube may be determined without counting. Beneath each tube is a slide moving horizontally between two base plates, each slide having a hole of the same diameter as the bore of the tube, so that the bottom one of the coins placed in the tube will drop into and occupy the hole in the slide and lie flatwise on the lower base plate. Each slide is normally pressed back beneath the tube by a spring, but when a slide is moved forward by pressing upon the key connected with it, it carries with it a coin, which is dropped into the hopper, from which it may be removed by pressing upon the lower finger piece. Upon a plate at one side of the tubes are fulcrumed tilting keys connected with the slides, and whose upper ends are bent outward through a slot in the case, where they terminate in finger pieces, which should be appropriately marked to indicate the denomination of the coin in the tube with which they are respectively connected. When the device is arranged for use in a store, a bell crank adapted to sound a gong is connected with the key by which the door in the hopper is opened, thus giving notice when the door is opened or any money is withdrawn.

Ebonite Packing Rings.

The pistons of the high pressure air compressors of the pneumatic tramway of Bern are packed with ebonite rings, which, like cast iron rings, fit in grooves, and are pressed against the cylinder sides by a double brass spring. Pistons thus packed are said to be tight, to last from three to four months, and to be cheap, and there is no wear of the cylinder sides.

A QUICK AND SURE CHICKEN BEHEADER.

The illustration shows a device for severing the head from the body of a chicken by simply pulling a trigger, without torturing the chicken or trying the nerves of the sensitive. The improvement has been patented by Mr. J. C. Denham, editor of the *Journal of Agriculture*, 1120 Pine Street, St. Louis, Mo. The barrel of the implement incases a main spring, and at its rear end is clamped by a breech block having upwardly extending flanges, forming guides for the knife, the flanges being recessed in the center to afford space for placing the neck of the chicken, and the beheading knife sliding across this space between the flanges. The knife is inclined, and its lower end slides in a slot in the top of the barrel, where it is secured to a sliding plunger, to which one end of the main spring is attached, the other end of the spring being secured to the barrel. In the front end of the barrel is a cushion, against which the extended shank of the plunger strikes, absorbing shock and limiting the forward movement of the plunger and knife. The plunger and knife are pulled back against the tension of the spring by handles on the sides of the plunger, the handles projecting through side slots in the breech block and barrel. A notch in the bottom of the plunger receives a pawl on the front end of a curved trigger, by which the knife and plunger are held in a rearmost position when the device is to be used. A depending hook or flange on the front end of the barrel may be hooked upon some object to facilitate pulling back the plunger, or to steady the implement when it is used. When the neck of the chicken is placed in the space provided therefor, and the trigger is pulled, the plunger is instantly released and the knife drawn rapidly forward, the cut being effected with certainty, neatness, and dispatch.

NEW FIRE ALARMS.

A few years ago we described the fire alarms that were being put in service in the streets of Paris. It was a question of an alarm upon a column, due to Mr. Petit, and in which a button pressed by a person asking for help actuated a bell and a clockwork that gave a signal at the engine house along with the number of the alarm brought into play. While offering decided advantages, this system was defective in some points. The firemen always had to proceed to the alarm whence the signal came in order to ask exactly where the fire was, and they did not know its nature.

So, while installing the Petit apparatus, the fire department, and particularly its eminent engineers, Commandant Krebs and Captain Cordier, set about to find something better. The ideal was to be able to permit the public to telephone to the engine houses all the details of the location, extent and nature of the fire. Unfortunately, the practice of telephony is still unfamiliar to many persons, and consequently what was necessary was an absolutely automatic apparatus that would attract the attention of the station by a bell, making known to the person calling that the indications given were understood. A very ingenious apparatus, due to Mr. Digeon, has been under trial for some time,

DENHAM'S CHICKEN BEHEADER.

and, having proved successful, has been rapidly put in service in a large number of quarters.

As to external aspect, this new apparatus differs but little from the Petit system. Like it, it comprises a square box painted red, mounted upon a column in the shape of a lamp post. The alarm and telephone, inclosed in the box, communicate, through wires running to the interior of the column, with two cables coming from the central station through the sewers. Let us walk around the apparatus: Here is the door, into which is set a small glass. At the top of the door we read: "In case of fire, break the glass and then cry out distinctly in the mouthpiece of the telephone the nature of the fire, the street, and the number" (Figs. 1 and 2). The normal type of alarm is provided with a small hammer like a door knocker, which permits of effecting the breakage of the glass, but this has been removed since it gives rise to mistakes. Let us strike hard, as another inscription tells us to, and, according also to these same instructions, the door will open and reveal the mouthpiece of the telephone placed in the interior. This opening, in fact, reveals itself to us at the bottom of the box, surrounded by the inscription in exergue: "Mouthpiece of the telephone." The directions are intelligently multiplied throughout the apparatus, and the most excited person cannot fail to see them. When the door opens, a ringing occurs that attracts the attention of passers-by and points out jokers. If we take a look at the enameled iron plate at the bottom of the box, we see that, as soon as the ringing ceases, we must shout in the telephone the fire that it is necessary to fight, and repeat this information until a roaring sound is heard, and which signifies that the firemen have started. After following these instructions to the letter, we can leave the apparatus, whose door remains persistently open. There is nothing more simple than all this, even for a child.

When a person breaks the glass he bears at the same time upon a metallic plate that swings upon a horizontal hinge above, and this motion disengages the bolt of the door, which opens through the pressure of three springs. A very simple play of levers frees the alarm bell, which is analogous to that of the old apparatus; but, at the same instant, this opening of the door sets in motion

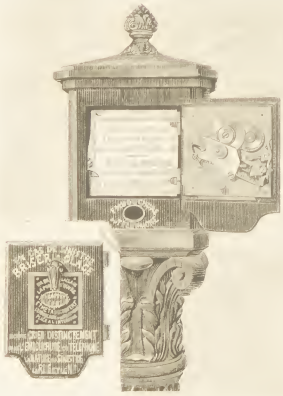


Fig. 1. NEW FIRE ALARM.

Fig. 2.—MANEUVER OF THE APPARATUS.

Fig. 3.—RECEIVING APPARATUS IN AN ENGINE HOUSE.